**Precalculus**

**Notes 9.3**

1. **Geometric Sequences**

Definition: A sequence is **geometric** if the ratios of consecutive terms are the same. So, the sequence is geometric if there is a number such that

and so on. The number is the **common ratio** of the sequence.

Ex. 1: The sequence whose th term is is geometric. For this sequence, the common ratio of consecutive terms is 2.

Ex. 2: The sequence whose th term is is geometric. For this sequence, the common ratio of consecutive terms is 3.

Ex. 3: The sequence whose th term is is geometric. For this sequence, the common ratio of consecutive terms is .

The sequence 1, 4, 9, 16, … whose th term is is not geometric.

1. **The th term of a Geometric Sequence**

The th term of a geometric sequence has the form where is the common ratio of consecutive terms of the sequence.

Every geometric sequence can be written in the form:

Ex. 4: Write the 1st 5 terms of the geometric sequence whose first term is and whose common ratio is .

Ex. 5: Find the 15th term of the geometric sequence whose first term is 20 and whose common ratio is 1.05.

Ex. 6: Find the 12th term of the geometric sequence 5, 15, 45, …

Ex. 7: The 4th term of a geometric sequence is 125, and the 10th term is Find the 14th term.

1. **The Sum of a Finite Geometric Sequence**

The sum of the finite geometric sequence with common ratio is given by .

Ex. 8: Find the sum

1. **Geometric Series**

Definition: The summation of the terms of an infinite geometric sequence is called an infinite geometric series or simply a **geometric series**.

If , the infinite geometric series has the sum

Note: If the series does not have a sum.

Ex. 9: Find each sum.